

APPENDIX E

PRE-EXCAVATION SAMPLING 2004, DEAD CREEK SEGMENTS D AND F INFORMATION

TECHNICAL MEMORANDUM

TO: Nabil Fayoumi

DATE: January 21, 2005

FR: Steve Smith

RE: Pre-Excavation Sampling of Bottom Soils, Dead Creek Sectors D and F

This Technical Memorandum presents the results of the recent sampling and analyses performed in Dead Creek Segments D and F in Sauget Area 1. The sampling and analyses were performed in accordance with the work outlined in the *Sauget Area 1 Time Critical Sediment Removal Action Creek Bottom Soil Removal Work Plan* (Work Plan) submitted to the United States Environmental Protection Agency (USEPA or Agency) by Solutia Inc. on May 17, 2004. The Work Plan was conditionally approved by the Agency on September 16, 2004.

Sampling and analyses of creek bottom soils were performed along transects of the creek at the conclusion of the Dead Creek Sediment Removal Action in 2002. The results of that sampling effort indicated that the soils in the bottom of some portions of the creek still contained levels of various constituents at concentrations that could create potentially adverse ecological impacts. In particular, the following creek segments were of concern:

- Creek Segment F (CS-F): - Sampling was conducted in the bottom of CS-F along transects spaced at approximately 400 foot centers. The samples along one of these transects, T5, contained zinc at a concentration in excess of the risk based concentration (RBC) of 4,739 mg/kg.
- Creek Sector D (CS-D): - Sampling transects in CS-D were spaced approximately 200 foot centers across the creek bottom. The results of analyses performed on these samples showed that the concentrations of polychlorinated biphenyls (PCBs) and dioxins could potentially impact fish along one transect (T6) located immediately upstream of the culvert at Jerome Lane. Zinc was also detected at concentrations above the RBC along other transect in this reach of the creek. However, since this and other sections of the creek are dry for a large part of the year because of dewatering, the resulting habitat is not conducive to a sustainable fish populations. Because of this, the Work Plan concluded that additional removal actions in the creek sector should only address PCBs and dioxins, since these are bioaccumulative organic constituents. However, it also concluded that monitoring would be appropriate to ensure that residual zinc in CS-D is not transported downstream. This same logic was applied to zinc detected along transect T16 in CS-E at a level in excess of the RBC.

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- Creek Sector B (CS-B) – Samples were obtained in CS-B at approximately 100 foot centers along the creek between Queeny Avenue and Judith Lane. Analyses of these samples indicated that residual PCBs were present above the RBC in the northern 700 feet of the creek sector between transects T0 and T7 and at two other transect locations further downstream (T11 in the middle of the segment and T17 at the southern end of the segment).

Based on an ecological risk assessment and the availability of capacity in the on-site containment cell, the Work Plan concluded that soils in CS-D containing PCBs and dioxins in excess of the RBCs should be removed, as should soils in CS-F containing zinc above the RBC. However, because of the relatively large distances between sampling transects in CS-D and CS-F, setting the excavation limits in these two segments based on the existing analytical data could result in larger excavations than necessary. Consequently, a pre-excavation sampling program was proposed in the Work Plan that was intended to minimize the excavation limits in each of these two sectors. It is noted that the sampling locations in the two creek sectors were selected to supplement the sampling performed in 2002 by providing information between the various sample transects. The locations were not selected to confirm the results obtained in 2002.

This document presents the results of the recent sampling and analysis and provides a comparison to the 2002 results.

Creek Sector D Excavation Area Sampling and Analyses

In 2002, soil samples were collected in Segment D in the depth range of 0 to 1 foot below ground surface in the creek channel along transects located approximately 200 feet apart. The sampling yielded a PCB concentration of 2.48 mg/kg at transect T6, exceeding the site-specific RBC for PCBs of 0.58 mg/kg. Transect T6 was located immediately upstream of the culvert under Jerome Lane and the PCB concentration at transect T5, the next transect upstream from T6, was 0.007 mg/kg. Thus, the 2002 sampling appeared to indicate that the area of concern for PCBs in CS-D was a 200 foot long stretch of the creek bottom, immediately upstream of the culvert on Jerome Avenue.

In order to better define the area of excavation, four locations spaced 50 feet apart were sampled and analyzed for PCBs in the 200-ft length of Segment D between Transect T5 and T6 in October 2004. These four sample locations (D1 through D4) are shown on the attached Figure 1, together with the locations of transects T3 through T6. At each of the four locations, samples were collected at one-foot intervals of depth to a depth of five feet using a hand-auger. Thus, a total of twenty soil samples were collected from Creek Segment D and submitted to Severn Trent Laboratory (STL) for analysis.

The samples were analyzed for PCBs using Method 680. The measured PCB concentrations were all below the RBC for PCBs of 0.58 mg/kg. In fact, PCBs were only detected in four of the samples, with the highest reported PCB concentration occurring in sample D3-1 (0.156

mg/kg). The analytical results of the PCB analyses are summarized in Table 1. In this table, the sample numbering system is such that sample number D1-1 corresponds to the sample collected at location D1 at a depth of 0 to 1 foot below ground surface.

Split samples were also obtained and screened for PCB content using immunoassay kits calibrated to identify PCB concentrations between 0.5 mg/kg and 5 mg/kg. Only one sample, D3-1, appeared to have a PCB concentration in the range between 0.5 and 5 mg/kg. This is the same sample in which the laboratory analyses reported the highest concentration of PCBs. All of the other samples screened below 0.5 mg/kg. Thus, it appears that the immunoassay screening provides a conservative overestimate of the PCB concentration in soils at the site and can be reliably used to control excavation, subject to laboratory confirmation of the results.

Creek Sector F Excavation Area Sampling and Analyses

In 2002, creek bottom soil samples were collected in Segment F in the depth interval of 0 to 1 foot along transects spaced at approximately 400 foot centers along the creek bottom. The results of the analyses of these samples showed that zinc was present at concentrations of 1,100 mg/kg, 15,000 mg/kg, and 3,200 mg/kg at Transect T4, T5, and T6, respectively. The concentration at T5 was the only one that exceeded the RBC for zinc of 4,739 mg/kg. The locations of these three sampling transects in CS-F are shown on Figure 2.

In order to better define the distribution of zinc in the creek bottom soils in this section of Dead Creek, 32 locations spaced approximately 25 feet on center were sampled and analyzed in November and December 2004 for zinc in the 800-ft length of CS-F between transects T4 and T6. Sample locations F1 through F32 in Segment F are shown on the attached Figure 2. At each of the 32 locations, samples were collected at one-foot intervals of depth to a depth of five feet using hand-auger. Thus, a total of 160 soil samples were collected from Creek Segment F and submitted to STL for zinc analyses.

Only 5 of the 160 samples from CS-F exceeded the RBC for zinc and all of these samples were collected in the 0 to 1 foot depth interval. The specific samples which contained zinc in excess of the RBC were F6-1 (6,740 mg/kg), F17-1 (4,840 mg/kg), F18-1 (12,300 mg/kg), F19-1 (5,540 mg/kg), and F26 (5,880 mg/kg). The zinc testing results are summarized in Table 2 and the sample locations at which the zinc concentration exceeded the RBC are highlighted on Figure 2..

Split samples were also analyzed for zinc using a portable x-ray fluorescence (XRF) screening device and the results of this testing are also reported in Table 2. Examination of the data shown in Table 2 demonstrates that the XRF screening is not a suitable tool for use in controlling excavation.

Summary of Results

The sampling locations selected in 2004 were not designed to provide confirmation of the results of the sampling and analyses carried out in 2002. Rather, they were selected to supplement the earlier information in an attempt to minimize the area of excavation.

Based on the new results, it appears that the PCBs detected at transect T6 in 2002 were a very localized and shallow occurrence, given that sample D4-1, located less than 20 feet away, contained approximately 0.014 mg/kg of PCBs. The 2004 sampling results indicate that PCB's are not present at depth in CS-D and are confined to a limited area around transect T6 at concentrations in excess of the RBC.

In CS-F, the new results confirm that zinc is present in some locations at concentrations in excess of the RBC. The impacts are limited to 3 localized areas, with the greatest impact lying between sample stations F16 and F20. All of the samples with zinc concentrations higher than the RBC were obtained in the shallow, near surface soils in the 0 to 1 foot depth range. samples.

The new results also indicate that immunoassay screening provides a good tool for use in controlling excavation in the field. It yields a conservatively high estimate of PCB concentration and, based on previous experience with a large number of tests, provides an estimate that is biased to be false positive. Conversely, XRF appears to underestimate the concentration of zinc in the soils in CS-F. As such, it is not considered to be a reliable field screening tool for controlling the extent of excavation in CS-F.

Proposed Limits of Excavation

Option 1

The Work Plan requires the excavation of all soils in CS-D and CS-F that contain PCBs or zinc in excess of the RBCs for these constituents, to a maximum volume of 19,000 cu. yd., or until the depth of excavation reaches the water table. If the volume excavated from these two segments turns out to be less than 19,000 cu. yd., then the Work Plan requires that soils with constituent concentrations greater than RBCs be excavated from the areas of CS-B until the total excavated volume is 19,000 cu. yd., or until the depth of excavation in this creek segment reaches the water table.

Using these criteria, the proposed excavation limits are as follows:

CS-F: - Referring to Figure 2, it is proposed to remove the upper one foot of soil along a reach of approximately 300 feet downstream of the bend in the creek at the location of sample number F15 (i.e., in the reach between samples F15 and F27). As well, the upper foot of soil will be removed from a section approximately 50 feet long between sample

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locations F5 and F7. Assuming an average channel width of 25 feet, the volume of soils excavated from CS-F will be approximately 325 cu. yd.

CS-D: - The results of the PCB analyses suggest that the area to be excavated in order to satisfy the Work Plan criteria is approximately 20 to 30 feet wide, centered on transect T6. However, the ecological risk assessment indicated that dioxins were also a constituent of concern in the creek segment. The sampling performed in 2004 focused on PCBs, since it was assumed that these could be used as a surrogate for dioxins in terms of defining the limits of creek bottom soil excavation. As such, none of the samples was analyzed for dioxins. In view of the limited distribution of PCBs in CS-D, however, it is considered prudent to excavate the soils in the stretch of creek bottom between transects T5 and T6, since it is known that the dioxin concentrations at T5 are below the RBC. Assuming a creek bottom width of 50 feet and an excavation depth of one foot, the volume of soil to be excavated in CS-D will be approximately 370 cu. yd.

CS-B: - The total volume to be excavated from CS-D and CS-F will be approximately 700 cu. yd. Consequently, the maximum volume of soil to be excavated from CS-B is expected to be approximately 18,300 cu. yd. However, if the excavation is concentrated in the apparent "hot spots", it is likely that the excavation depths in these areas will reach the water table well before this excavation limit is achieved. Based on the sampling performed in 2002, PCBs exceed the RBC in three areas of CS-B:- in the northern 700 feet of the creek segment between transects T0 and T7, in the middle of the segment in the vicinity of transect T11, and at the southern end of the segment, close to Judith Lane, at transect location T17. Soil excavations should be concentrated in these three sections of the creek.

Shallow groundwater elevations are available from two monitoring wells located immediately upgradient of the TSCA containment cell, within 20 to 30 feet of the western bank of the creek. These wells are sampled quarterly and the last set of water levels obtained in December 2004 indicate that the shallow groundwater table was at elevation 398.7 feet at that time. Topographic surveys were carried out following the sediment removal action in 2002. Using this information, topographic cross sections were developed at 50 foot intervals along CS-B and these cross sections show that the creek bottom elevation in the vicinity of the wells varies between 395 and 397 feet. Thus, the groundwater level was higher than the creek bottom in December 2004. Since this was an unusually wet December, the water levels in 2001 were reviewed and these indicated that the groundwater elevation at that time was approximately 396 feet, at the same level as the creek bottom, or slightly below. The cross sections were presented in Section 8 of the Work Plan.

These data suggest that the water table is currently at, or above the creek bottom and no excavation need be done if the criteria defined in the Work Plan are strictly applied. However, excavation to a limited depth below the water table is feasible without unduly elaborate dewatering methods and, in order to remove some or all of the PCB impacted soils

from the three sections of the creek, it is proposed under this option that some excavation be carried out in these areas.

In order to establish excavation limits in these three areas, the depth of excavation was selected to be equal to the deepest point of the existing channel. Examination of the cross sections shows that this point is almost invariably along the western side of the channel and that the bottom in the eastern side is typically several feet higher. Thus, it is proposed that the creek bottom in these areas be excavated such that the eastern side of the channel is lowered to the same elevation as the western side. This also has the advantage that it will remove the most impacted soils from the channel bottom. As noted in the Work Plan (Section 6.1), the higher PCB concentrations in each of the three areas of CS-B occur in the central or eastern portions of the transects and, in fact, the PCB concentrations in the soils in the western portion of the transects are all below the RBC, with the exception of transect T1. Consequently, the proposed excavation plan will essentially achieve the intent of the Work Plan, which is removal of PCB from CS-B in excess of RBCs. Under this option, some residual PCB concentrations in excess of the RBC could remain in the vicinity of transect T1.

Assuming an average bottom width of 60 feet, it is estimated that approximately 6,700 cu. yd. of soil will be excavated from the three areas of CS-B using the proposed plan. Combining this with the estimated total of 700 cu. yd. to be excavated from CS-D and CS-F results in a total excavated volume of about 7,400 cu. yd. While this is significantly less than the 19,000 cu. yd. discussed in the Work Plan, it does achieve the goals of the removal action without unduly jeopardizing the stability of the creek banks or requiring elaborate groundwater control systems.

Option 2

Option 2 would result in the same excavation logic and estimated quantities in Sector D and Sector F as described above.

Option 2 provides for a more conservative approach of removing roughly 4.6 feet (average) along the entire length of Sector B. Excavating additional material to this depth will require a detailed analysis of the stability of the creek banks. The banks in the northern third of the creek are steep (between 2H to 1V and 3H to 1V) and settlement sensitive structures are present within about 30 feet of the top of the east bank. The Site G landfill is immediately adjacent to the west bank in this stretch of the creek. In order to excavate a total of approximately 18,300 cu. yd. from CS-B (the amount estimated to yield a total excavated volume of 19,000 cu. yd.), the depth of excavation will have to be an average of 4.6 feet over the entire 1,800 feet of CS-B. This excavation depth may require the need for side support systems, such as sheet piles, in the northern third of the eastern bank and along the entire western bank since a high pressure petroleum pipeline runs within feet of this bank. A detailed geotechnical investigation and analysis would be required to evaluate the need for such side support systems and, if required, these systems will have to be carefully designed.

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This option will also result in the containment cell being visually more intrusive than would be the case if Option 1 were selected since the height of the final cover will be 7 to 10 feet more.

Schedule

The schedule for the completion of excavation will depend on the amount of material to be excavated from Dead Creek. Although the excavation in CS-D and CS-F can begin in the relatively near future, it would be impractical to remove the temporary cover from the containment cell until the limits of all of the excavation areas are defined and each of the areas is ready for work to begin.

If Option 1 is adopted, then the excavation can be completed in accordance with the approved schedule, a copy of which is attached. However, if Option 2 is selected, then additional time will be required to perform a geotechnical investigation and design a side support system for the creek banks.

A schedule for Option 2 is shown below.

OPTION 2 SCHEDULE

Task No.	Activity Description	Duration
1	Geotechnical Investigation and Analyses	Six weeks after EPA approval of modified Work Plan
2	Design of Temporary Support Systems and Submission of Excavation Design Plan	One month after completion of Task 1
3	Excavation of CS-D, F, and B, and Transport to Cell	Three months after EPA review and approval of Excavation Design Plan developed in Task 2
4	Construction of CS-B Liner and Containment Cell Final Cover.	Three months after completion of Task 3

TABLE 1
Summary of PCB analysis
Segment D soil samples
Dead Creek Sauget Area 1
Sauget, Illinois

SAMPLE ID		D1-1	D1-2	D1-3	D1-4	D1-5	D2-1	D2-2
DATE SAMPLED		10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004	10/27/2004
COMPOUND NAME	UNITS							
Decachlorobiphenyl	ug/kg	30 U	28 U	24 U	24 U	24 U	28 U	25 U
Dichlorobiphenyl	ug/kg	5.9 U	5.4 U	4.6 U	4.6 U	4.6 U	5.5 U	4.9 U
Heptachlorobiphenyl	ug/kg	18 U	16 U	14 U	14 U	14 U	17 U	15 U
Hexachlorobiphenyl	ug/kg	12 U	11 U	9.4 U	9.3 U	9.4 U	11 U	10 U
Monochlorobiphenyl	ug/kg	5.9 U	5.4 U	4.6 U	4.6 U	4.6 U	5.5 U	4.9 U
Nonachlorobiphenyl	ug/kg	30 U	28 U	24 U	24 U	24 U	28 U	25 U
Octachlorobiphenyl	ug/kg	18 U	16 U	14 U	14 U	14 U	17 U	15 U
Pentachlorobiphenyl	ug/kg	12 U	11 U	9.4 U	9.3 U	9.4 U	11 U	10 U
Tetrachlorobiphenyl	ug/kg	12 U	11 U	9.4 U	9.3 U	9.4 U	11 U	10 U
Trichlorobiphenyl	ug/kg	5.9 U	5.4 U	4.6 U	4.6 U	4.6 U	5.5 U	4.9 U

Notes:

BOLD values indicate detected compounds.

U - indicates that the compound was analyzed for but not detected at the associated reporting limit.

J - indicates that the compound was detected but the result is less than the sample reporting limit and greater than the method detection limit.

Sample ID's indicate sample location and depth. D1-1 corresponds to sample location D-1 at a depth of 0-1 feet below ground surface. Likewise, D1-5 corresponds to a depth of 4-5 feet below ground surface.

TABLE 1
Summary of PCB analysis
Segment D soil samples
Dead Creek Sauget Area 1
Sauget, Illinois

SAMPLE ID DATE SAMPLED		D2-3	D2-4	D2-5	D3-1	D3-2	D3-3	D3-4
COMPOUND NAME	UNITS							
Decachlorobiphenyl	ug/kg	23 U	23 U	24 U	25 U	2.4 J	24 U	23 U
Dichlorobiphenyl	ug/kg	4.5 U	4.5 U	4.6 U	4.8 U	5.2 U	4.6 U	4.5 U
Heptachlorobiphenyl	ug/kg	14 U	14 U	14 U	5.6 J	16 U	14 U	14 U
Hexachlorobiphenyl	ug/kg	9.2 U	9.2 U	9.4 U	47	2.9 J	9.3 U	9.2 U
Monochlorobiphenyl	ug/kg	4.5 U	4.5 U	4.6 U	4.8 U	5.2 U	4.6 U	4.5 U
Nonachlorobiphenyl	ug/kg	23 U	23 U	24 U	25 U	26 U	24 U	23 U
Octachlorobiphenyl	ug/kg	14 U	14 U	14 U	15 U	16 U	14 U	14 U
Pentachlorobiphenyl	ug/kg	9.2 U	9.2 U	9.4 U	78	4.3 J	9.3 U	9.2 U
Tetrachlorobiphenyl	ug/kg	9.2 U	9.2 U	9.4 U	24	10 U	9.3 U	9.2 U
Trichlorobiphenyl	ug/kg	4.5 U	4.5 U	4.6 U	1.6 J	5.2 U	4.6 U	4.5 U

Notes:

BOLD values indicate detected compounds.

U - indicates that the compound was analyzed for but not detected at the associated reporting limit.

J - indicates that the compound was detected but the result is less than the sample reporting limit and greater than the method detection limit.

Sample ID's indicate sample location and depth. D1-1 corresponds to sample location D-1 at a depth of 0-1 feet below ground surface. Likewise, D1-5 corresponds to a depth of 4-5 feet below ground surface.

TABLE 1
Summary of PCB analysis
Segment D soil samples
Dead Creek Sauget Area 1
Sauget, Illinois

SAMPLE ID DATE SAMPLED		D3-5	D4-1	D4-2	D4-3	D4-4	D4-5
COMPOUND NAME	UNITS	10/27/2004	10/25/2004	10/25/2004	10/25/2004	10/25/2004	10/25/2004
Decachlorobiphenyl	ug/kg	23 U	4.9 J	26 U	23 U	24 U	25 U
Dichlorobiphenyl	ug/kg	4.5 U	4.7 U	5.1 U	4.4 U	4.6 U	4.8 U
Heptachlorobiphenyl	ug/kg	14 U	2.3 J	15 U	14 U	14 U	15 U
Hexachlorobiphenyl	ug/kg	9.2 U	1.6 J	10 U	9 U	9.3 U	9.8 U
Monochlorobiphenyl	ug/kg	4.5 U	4.7 U	5.1 U	4.4 U	4.6 U	4.8 U
Nonachlorobiphenyl	ug/kg	23 U	24 U	26 U	23 U	24 U	25 U
Octachlorobiphenyl	ug/kg	14 U	2.3 J	15 U	14 U	14 U	15 U
Pentachlorobiphenyl	ug/kg	9.2 U	1.8 J	10 U	9 U	9.3 U	9.8 U
Tetrachlorobiphenyl	ug/kg	9.2 U	9.6 U	10 U	9 U	9.3 U	9.8 U
Trichlorobiphenyl	ug/kg	4.5 U	0.72 J	5.1 U	4.4 U	0.82 J	4.8 U

Notes:

BOLD values indicate detected compounds.

U - indicates that the compound was analyzed for but not detected at the associated reporting limit.

J - indicates that the compound was detected but the result is less than the sample reporting limit and greater than the method detection limit.

Sample ID's indicate sample location and depth. D1-1 corresponds to sample location D-1 at a depth of 0-1 feet below ground surface. Likewise, D1-5 corresponds to a depth of 4-5 feet below ground surface.

Table 2
Summary of XRF and Laboratory Zinc Results
for Dead Creek Segment F Soil Samples
Sauget, Illinois

Sample ID	Date Collected	Date (XRF)	XRF Zn Avg (mg/kg)	Lab Zn Result (mg/kg)
F01-1	10/25/04	12/6/04	121	53
F01-2	10/25/04	12/6/04	125	59
F01-3	10/25/04	12/6/04	128	44
F01-4	10/25/04	12/6/04	126	46
F01-5	10/25/04	12/6/04	114	48
F02-1	11/29/04	12/6/04	191	145
F02-2	11/29/04	12/6/04	144	98
F02-3	11/29/04	12/6/04	133	109
F02-4	11/29/04	12/6/04	121	48
F02-5	11/29/04	12/6/04	124	59
F03-1	11/29/04	12/7/04	696	1010
F03-2	11/29/04	12/7/04	243	376
F03-3	11/29/04	12/7/04	170	77
F03-4	11/29/04	12/7/04	98	82
F03-5	11/29/04	12/7/04	119	93
F04-1	11/29/04	12/6/04	1038	1480
F04-2	11/29/04	12/6/04	252	406
F04-3	11/29/04	12/6/04	249	465
F04-4	11/29/04	12/6/04	123	140
F04-5	11/29/04	12/6/04	127	156
F05-1	11/29/04	12/6/04	1841	2740
F05-2	11/29/04	12/6/04	165	351
F05-3	11/29/04	12/6/04	155	75
F05-4	11/29/04	12/6/04	123	91
F05-5	11/29/04	12/6/04	156	143
F06-1	11/29/04	12/6/04	1156	6740
F06-2	11/29/04	12/6/04	603	1440
F06-3	11/29/04	12/6/04	265	228
F06-4	11/29/04	12/6/04	152	340
F06-5	11/29/04	12/6/04	177	109
F07-1	11/29/04	12/7/04	750	1570
F07-2	11/29/04	12/7/04	862	1910
F07-3	11/29/04	12/7/04	264	277
F07-4	11/30/04	12/7/04	111	132
F07-5	11/30/04	12/7/04	317	211
F08-1	11/29/04	12/6/04	1287	1970
F08-2	11/29/04	12/6/04	209	487
F08-3	11/29/04	12/6/04	353	241
F08-4	11/29/04	12/6/04	527	450
F08-5	11/29/04	12/6/04	503	657
F09-1	11/30/04	12/7/04	1593	3280
F09-2	11/30/04	12/7/04	595	1200
F09-3	11/30/04	12/7/04	614	1080
F09-4	11/30/04	12/7/04	530	303
F09-5	11/30/04	12/7/04	90	165
F10-1	12/02/04	12/7/04	1034	1510

**Summary of XRF and Laboratory Zinc Results
for Dead Creek Segment F Soil Samples
Sauget, Illinois**

Sample ID	Date Collected	Date (XRF)	XRF Zn Avg (mg/kg)	Lab Zn Result (mg/kg)
F10-2	12/02/04	12/7/04	775	2060
F10-3	12/02/04	12/7/04	236	462
F10-4	12/02/04	12/7/04	237	208
F10-5	12/02/04	12/7/04	77	66
F11-1	12/02/04	12/7/04	902	1740
F11-2	12/02/04	12/7/04	843	1300
F11-3	12/02/04	12/7/04	162	163
F11-4	12/02/04	12/7/04	71	45
F11-5	12/02/04	12/7/04	77	52
F12-1	12/02/04	12/7/04	1087	2000
F12-2	12/02/04	12/7/04	331	652
F12-3	12/02/04	12/7/04	155	128
F12-4	12/02/04	12/7/04	245	148
F12-5	12/02/04	12/7/04	155	94
F13-1	12/02/04	12/7/04	935	1980
F13-2	12/02/04	12/7/04	365	709
F13-3	12/02/04	12/7/04	213	327
F13-4	12/02/04	12/7/04	90	171
F13-5	12/02/04	12/7/04	199	132
F14-1	12/02/04	12/7/04	2313	2240
F14-2	12/02/04	12/7/04	443	2160
F14-3	12/02/04	12/7/04	234	98
F14-4	12/02/04	12/7/04	116	169
F14-5	12/02/04	12/7/04	328	83
F15-1	12/02/04	12/7/04	895	862
F15-2	12/02/04	12/7/04	475	623
F15-3	12/02/04	12/7/04	202	309
F15-4	12/02/04	12/7/04	74	90
F15-5	12/02/04	12/7/04	164	63
F16-1	12/02/04	12/7/04	342	372
F16-2	12/02/04	12/7/04	128	185
F16-3	12/02/04	12/7/04	175	186
F16-4	12/02/04	12/7/04	152	158
F16-5	12/02/04	12/7/04	93	38
F17-1	12/02/04	12/7/04	2079	4840
F17-2	12/02/04	12/7/04	484	985
F17-3	12/02/04	12/7/04	422	498
F17-4	12/02/04	12/7/04	1023	465
F17-5	12/02/04	12/7/04	177	168
F18-1	12/02/04	12/7/04	3647	12300
F18-2	12/02/04	12/7/04	2630	2230
F18-3	12/02/04	12/7/04	837	316
F18-4	12/02/04	12/7/04	741	582
F18-5	12/02/04	12/7/04	314	340
F19-1	12/02/04	12/7/04	2162	5540
F19-2	12/02/04	12/7/04	1016	886

**Summary of XRF and Laboratory Zinc Results
for Dead Creek Segment F Soil Samples
Sauget, Illinois**

Sample ID	Date Collected	Date (XRF)	XRF Zn Avg (mg/kg)	Lab Zn Result (mg/kg)
F19-3	12/02/04	12/7/04	133	175
F19-4	12/02/04	12/7/04	102	111
F19-5	12/02/04	12/7/04	229	85
F20-1	12/02/04	12/7/04	1890	4200
F20-2	12/02/04	12/7/04	475	1450
F20-3	12/02/04	12/7/04	135	249
F20-4	12/02/04	12/7/04	121	77
F20-5	12/02/04	12/7/04	579	1220
F21-1	12/02/04	12/7/04	1429	2410
F21-2	12/02/04	12/7/04	669	1230
F21-3	12/02/04	12/7/04	413	688
F21-4	12/02/04	12/7/04	170	134
F21-5	12/02/04	12/7/04	149	89
F22-1	12/02/04	12/7/04	886	1560
F22-2	12/02/04	12/7/04	627	1200
F22-3	12/02/04	12/7/04	427	1510
F22-4	12/02/04	12/7/04	371	638
F22-5	12/02/04	12/7/04	441	1040
F23-1	12/02/04	12/7/04	1292	2940
F23-2	12/02/04	12/7/04	913	2230
F23-3	12/02/04	12/7/04	649	1920
F23-4	12/02/04	12/7/04	104	233
F23-5	12/02/04	12/7/04	805	815
F24-1	12/02/04	12/7/04	576	862
F24-2	12/02/04	12/7/04	832	1460
F24-3	12/02/04	12/7/04	645	1950
F24-4	12/02/04	12/7/04	792	553
F24-5	12/02/04	12/7/04	119	123
F25-1	12/02/04	12/7/04	961	1650
F25-2	12/02/04	12/7/04	1670	1590
F25-3	12/02/04	12/7/04	732	1540
F25-4	12/02/04	12/7/04	172	215
F25-5	12/02/04	12/7/04	305	189
F26-1	12/02/04	12/7/04	3129	5880
F26-2	12/02/04	12/7/04	770	1190
F26-3	12/02/04	12/7/04	179	288
F26-4	12/02/04	12/7/04	439	463
F26-5	12/02/04	12/7/04	498	293
F27-1	12/02/04	12/7/04	1389	3670
F27-2	12/02/04	12/7/04	884	1500
F27-3	12/02/04	12/7/04	1039	1740
F27-4	12/02/04	12/7/04	421	659
F27-5	12/02/04	12/7/04	315	258
F28-1	12/02/04	12/7/04	860	1250
F28-2	12/02/04	12/7/04	689	1050
F28-3	12/02/04	12/7/04	779	1350
F28-4	12/02/04	12/7/04	249	154

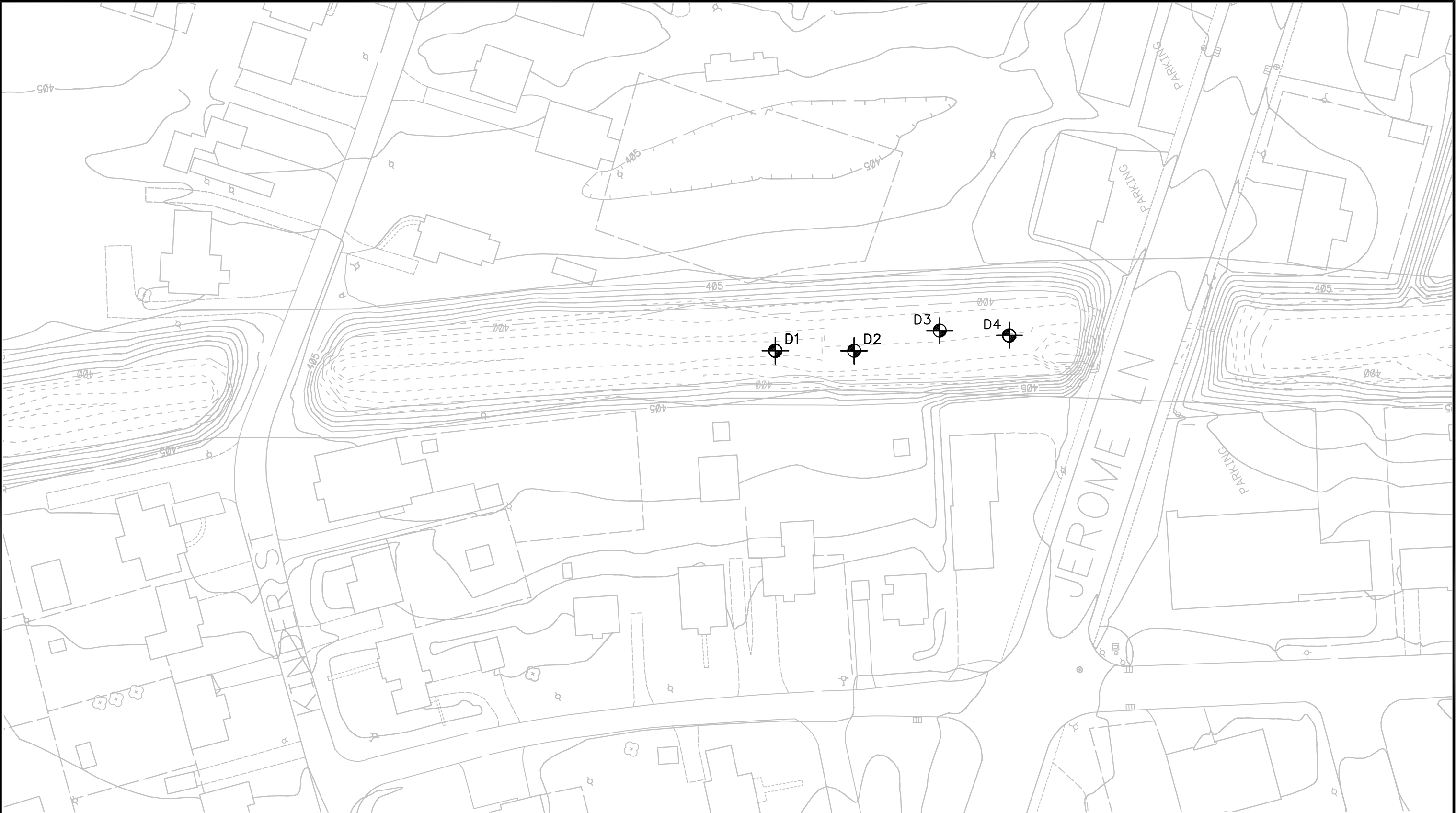
**Summary of XRF and Laboratory Zinc Results
for Dead Creek Segment F Soil Samples
Sauget, Illinois**

Sample ID	Date Collected	Date (XRF)	XRF Zn Avg (mg/kg)	Lab Zn Result (mg/kg)
F28-5	12/02/04	12/7/04	164	270
F29-1	12/02/04	12/7/04	869	2150
F29-2	12/02/04	12/7/04	937	784
F29-3	12/02/04	12/7/04	255	423
F29-4	12/02/04	12/7/04	167	339
F29-5	12/02/04	12/7/04	140	79
F30-1	12/03/04	12/7/04	564	1580
F30-2	12/03/04	12/7/04	345	1260
F30-3	12/03/04	12/7/04	299	682
F30-4	12/03/04	12/7/04	93	77
F30-5	12/03/04	12/7/04	81	103
F31-1	12/03/04	12/7/04	667	1270
F31-2	12/03/04	12/7/04	324	404
F31-3	12/03/04	12/7/04	155	87
F31-4	12/03/04	12/7/04	60	552
F31-5	12/03/04	12/7/04	88	95
F32-1	12/03/04	12/7/04	1498	2420
F32-2	12/03/04	12/7/04	1421	2170
F32-3	12/03/04	12/7/04	1329	2160
F32-4	12/03/04	12/7/04	207	474
F32-5	12/03/04	12/7/04	108	207

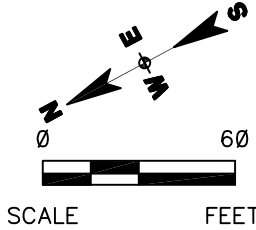
Correlation between XRF average result and laboratory result:

0.861

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LEGEND
✚ PCB SAMPLE LOCATION



DEAD CREEK SAUGET/CAHOKIA, ILLINOIS		PROJECT NO. 21561458.00000	
URS			
DRN. BY:djd 11/10/04 DSGN. BY: jr CHKD. BY:	Dead Creek Segment D PCB Sample Locations		FIG. NO. 1

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